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SEAFLOOR INVESTIGATIONS FOR HABITAT MAPPING ON THE CONTINENTAL SHELF OF THE MALTESE ISLANDS

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Habitat maps have several applications ranging from ecological (e.g. MPAs, Natura 2000 sites,) to socio-economic, when they are used to assess exploitation areas of viable resources. Nowadays a systematic and accurate production of benthic habitat maps addresses a growing global need for better spatial management of the marine environment. In particular, shallow marine areas are the most affected by human activities and the areas close to the coasts are the less investigated because of their very small and highly variable depths, so that studies in this areas are often missing. In this research field, geologists' and geophysicists' contribution is fundamental for the interpretation of seafloor geology and geomorphology, analysing the sediment distribution and identifying key areas for relevant marine habitats.
The Mediterranean Sea is s a perfect example, characterised by a complex geological setting, a high diversity of ecologically important marine habitats and highly exploited for human activities. The continental shelf offshore the eastern coasts of the Maltese archipelago and offshore the north-western coast of the Island of Malta was investigated in the last years through multibeam surveys. High-resolution bathymetry (ranging in depth from 2 to 402 m on the east and from 2 to 154 m on the west) and seafloor reflectivity data were produced and analysed to produce a benthic habitat map of the continental shelf around the Maltese archipelago. Grab samples were collected on the eastern continental shelf and used to ground-truth the results, while the western area was examined through an unsupervised classification. The seafloor morphology have been quantitatively and automatically analysed through the Benthic Terrain Modeller (BTM) toolbox for ArcGIS. This tool analyses the Bathymetric Position Index and the slope to classify the seafloor in crests, depressions, flat areas and slopes. The backscatter data is function of the type of material covering the seafloor surface and of the morphology (e.g. roughness); acoustic textures and their variations were analysed through the TexAn software – proprietary to the University of Bath. The end-product is a sediment map of the Maltese continental shelves, complemented with the grab samples available for the eastern continental shelf. The biological information obtained from grab samples, manual interpretation of the backscatter, literature and the Malta Environment & Planning Authority (MEPA) map server have been added to the previous maps. The most relevant records are constituted by the distribution of *Posidonia oceanica* meadows and maërl beds settled on bedrock, rock blocks accumulations and sand. The combination with morphometric analyses, sediment distribution map and biological information produces a ground-checked map of potential habitats in these areas.